ABSTRACT

A channel estimation method and apparatus for GSM/EDGE digital communications systems utilizing previously unexploited properties of GSM/EDGE training sequences to permit a more efficient initial channel estimation for equalizer operation and for joint synchronization and equalizer window sizing. In particular, any consecutive 16-symbol segment of the 26-symbol GSM/EDGE training sequences is both shift invariant and order invariant; and these properties enable channel estimation to be carried out on delayed (shifted) training sequence segments, permitting ISI corrupted leading symbols to be avoided in computations and leading taps to be estimated, using the same training sequence segments, regardless of equalizer window size; and to enable all the 1-8 tap channels to be estimated without matrix inversion, permitting a significant reduction in computational complexity. A two-dimensional recursive relation is established that leads to efficient channel tap calculation for different sync points and tap-positions which enables practical joint optimization of synchronization and window sizing for the equalizer.